

# CHAPTER 1: INTRODUCTION

## 1.1 Background

Electricity requirement in Sri Lanka is increasing exceedingly in past few years. 71% of electricity generation is based on thermal generating plants mainly by using diesel, heavy fuel and Coal. [1] Only 1% of total generation is based on Non-Conventional Renewable Energy sources. The balance 28% is based on Hydro power generation which is mainly depends on rain. If the rain is not favorable the burden also has to compensate by thermal generation plants whatever the cost is.

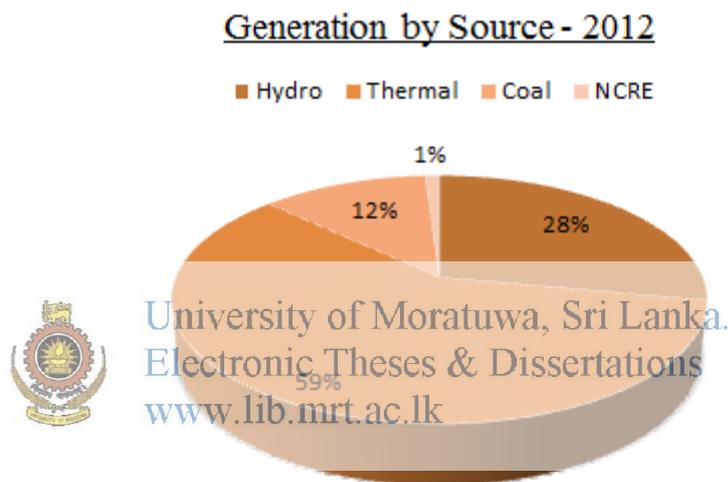


Fig 1.1: Electricity generation by Source

The main reason for this situation was identified as the delay of implementation of low cost thermal power generating plants. As an example, coal power plants which are cheaper comparing with Diesel and Heavy fuel that are using presently with very high cost.

Also, Sri Lanka has exploited its low cost conventional renewable energy source, major hydroelectric resources to its maximum economic potential. Hence the gap between low cost electricity generation and daily demand of electricity is increasing day by day. However, Ceylon Electricity Board has taken some positive steps to overcome this situation by reducing the transmission and distribution line losses,

obtaining the reduction of maximum demand etc. But the mean time the per capita average electricity consumption is increased by 7.3% by year 2012 [1].

Presently to fill up the gap between low cost electricity supply and demand of electricity, thermal power is the only viable solution and it must be used without considering its high cost. This will result a major financial, environmental and power crisis to the country as fossil fuel to be imported to the country with increasing price. The ultimate result would be a high pricing of electricity and eventually the government will pass this high electricity pricing to the consumers. As a result it will be possible to treat electricity as a luxurious need in the country. It will also possible that major and minor industries which are using the high cost electric power, to close down their business as they cannot compete with their competitors abroad. Further, the foreign investors also reluctant to invest their money in the country and they will find countries which are offering cheap electricity and labor.

To fill the gap between the amount of low cost hydroelectricity and increasing demand, it is obvious that more usage of electricity generated by renewable sources or alternate energy sources since the nuclear energy technology is far away to Sri Lanka. However the non-conventional energy sources such as wind power, mini/micro hydropower, solar and biomass may not be able to utilize completely to fulfil the gap between low cost hydroelectricity and increasing demand. This is due to high unit cost of certain renewable energy technologies, less capacities and other limitations of availability. Hence, the development of available low cost renewable energy source can play great roll of reducing the bad impacts of high cost thermal electricity generation. Also if the selected source is freely available throughout the country the transmission cost can be minimized.

The main components of non-conventional renewable energy sources for generating electricity identified in the country were small hydro energy, wind energy, solar energy and biomass energy. The capacity of availability of small hydro energy is almost utilized and some are not viable due to environmental and social restrictions. Wind energy is the most promising renewable energy source but the wind belt is laid through the coastal area in Kalpitiya to Mannar causing limitations and far away to

the National electricity grid. Hence, to catch whatever the available energy, it is necessary to construct lengthy transmission lines which are very expensive. Solar photo voltaic electricity generation is also not very suitable solution since its less efficiencies and initial high cost.

Considering all the facts discussed above, the energy from Biomass is the only workable solution for solve the problem at least up to some extent.

Biomass is the most common energy source in domestic sector of Sri Lanka but not much involved to power generation. At present firewood is mainly used for domestic energy needs like cooking. Some agricultural and industrial wastes are used for cogeneration plants in small scale. Municipal solid waste is also considered a form of renewable energy in the category of biomass.

Most of the areas in Sri Lanka is urbanizing rapidly over the past few years especially in western province. Generations of Municipal Solid waste in these areas are also increasing proportionately. Disposing of a huge amount of MSW is a serious problem to local authorities. Open dumping of MSW will cause many social and health problems.



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Management of municipal solid waste is a severe issue globally too since its generation is increasing day by day. Many social, health and environmental problems occur around the Municipal solid waste dump yards. To overcome this problem there are many methods practicing around the world. But this issue is site specific, area specific & country specific.

## **1.2 Objective**

The main objective of this study is to analyze the technical and financial viability of Municipal solid waste (MSW) power generating plant for grid electricity generation in Sri Lanka. Also to identify waste, more specifically as Municipal Solid Waste, its generation, collection, storage and utilization methods with mainly power generation option.

Also to carry out a survey to identify

- Properties of MSW.
- MSW generation by provincial level
- Collection methods
- Methods available to generate electricity from municipal solid waste (MSW).
- Options available for power generation by using MSW.



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